

NOTES
ON THE
FORESTS OF THE BANSWARA
STATE.

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- (ii) Clearing a network of intermediate fire lines so as to divide the forest into small areas to prevent the fire lighted in one portion of the forest to cross into another portion.
- (iii) To maintain a staff of special fire watchers during the season when there is danger from fire, i.e., after the grass has dried up to the setting in of the monsoon.

5. The width of fire lines depends on the height and density of the grass crop, prevalence or otherwise of heavy winds during the fire season. The width may be from 40 feet to 100 feet and even in special cases 150 feet. A width of 60 feet would suffice in the forests of this State.

6. The cost of protecting forests from fire in the Central Provinces is 2 annas 6 pies per acre or Rs. 100 per square mile per annum. The cost under present conditions of the State forests is prohibitive, but the boundary fire lines may be cleared, as also a certain width along both sides of the existing village paths be kept clear. Besides the above, villages inside the reserve may be made to clear a cordon round their villages, by cutting a check line of say 5 feet width on the forest side and then burning the grass, under the supervision of the forest staff.

7. Villagers may also be made to understand that lighting of fires in the forest will not be allowed to go unpunished. The villagers who do not help in finding out the culprit may have their rights suspended for a period not exceeding five years in the area burnt by any one of their community.

8. Small rewards may also be granted to the villagers in the case of the forests in which they have rights of escaping it from fire.

9. Burning of fire lines should be done at night time, as sparks are noticeable easily at that time, and owing to less heat than during the day, the operation can be carried out easily.

Demarcation

10. A line of 60 feet in width should be cleared of all growth, and kept clear year after year, by cutting a check line of 5 feet width and burning the rest. This will serve a double purpose :—

- (a) Serve as fire line.
- (b) Boundary line and, except in hilly ground, as an export line as well. Pillars should be erected in such a manner that one pillar can be seen from the other and numbered consecutively, the numbers being cut either on some fairly big stone used in construction of the pillar, or on a stout wooden post which may be placed in the centre of the pillar, and left one foot above the pillar.

Rights and their restriction and regulation.

11. The people are accustomed to cut and use anything they like. The huts are built in a most wasteful manner, and in parts of the forests where bamboo is not obtainable, the walls are simply a double row of posts filled in by poles placed length-wise, sometimes mud plastered, while at others even without a plaster. In parts where bamboos are available the walls consist of bamboos.

The Bhils should be induced to make walls of mud, as is done even by the Bhils in portions of this State where no forests are near. In this way a large waste of valuable material will be avoided, and the produce rendered available for export.

12. The rights may roughly be divided into two kinds :—

(i) For which the right holders may not have to get previous permission of the Forest Officer are these :—

- (a) Grazing of the cattle, being the *bonâ fide* property of the right holders.
- (b) Grass cutting.
- (c) Dead and fallen wood for burning purposes.
- (d) Dead and fallen wood for burning purposes for sale in town in head loads only.
- (e) Collection of wild fruits, flowers, and honey.

(ii) Those rights for the exercise of which previous permission of the Forest Officer should be necessary :—

- (a) Timber and bamboos for houses, and agricultural implements.
- (b) Green trees to be felled for fire-wood purposes only in case of there being no dry fallen wood available.

If these suggestions be accepted and carried out, there will be less waste of material, and consequently the quantity available for export, stated in the main body of the report, will be considerably increased, resulting in the corresponding increase in the net surplus of the period.

13. The grass is very plentiful, but there is no lack of grass in areas of the adjoining States situated favourably to the centres of consumption. The carriage rate is annas 8 to annas 6 per maund to the nearest Railway Station. The season when the grass should be cut and turned into hay corresponds with harvest time of the year, and it is doubtful whether sufficient labour will be available. If labour be available, hay could be turned out at anna 1 per maund, and assuming the carriage rate at annas 7 per maund, it could be delivered at annas 8 per maund, provided a purchaser could be found to buy at annas 9 a maund. The State may make anna 1 per maund on the quantity delivered. Other minor produces are gums of Dhaura, Khankra, Acacias, Karaih Albizzias ; the villagers may be allowed to collect on payment of the usual customs duty ; then these roots such as Dhauri and Siyah Muslis, leases for the collection of which may be sold.

Utilization
of grass and
other minor
produce.

14. Large areas are covered by Khankra and Zyzyphus, the species suited to lac culture, and at present unsaleable as wood. The lac seed should be obtained from the Central Provinces and propagated. This will in time yield a large revenue.

PART I.

I.—SUMMARY OF FACTS ON WHICH THE PROPOSALS ARE BASED.

1. The Banswara State is situated in the extreme south of Rajputana, and is bounded on the north and north-west by Dungarpur and Mewar, on the north-east by Partabgarh; on the south and south-east by Rutlam and Kushalgarh, and on the south-west by Panchmahals and the Rewa Kantha States of the Bombay Presidency. 1. Name and Situation.
2. It consists almost entirely of low hills covered with the forest growth of various descriptions; the hills surrounding the State on all sides. In the centre, a basin of more or less level ground, 25 miles long by 10 miles broad, is farmed; this portion is comparatively very poor in forest vegetation. 2. Configuration of the ground.
3. The State is drained by the following rivers :—
 - (a) North-east corner of the State is drained by the Eran river with its tributaries Ponan, Pandia and other nallahs.
 - (b) The south and south portion by the Anas and its tributaries, of which the largest is the Haran river.
 - (c) The central portion by the Chap and its tributaries the Nagdi, Khoodi, and Khatol.
 - (d) These all flow into the Mahi river which carries away the whole drainage of the State. The Mahi rises in the south-east of the State in Central India, enters Banswara on the east border, and flows for 32 miles in a northerly direction through hills, where it is joined by the Eran. Then it turns to the west for about 12 miles and again to the south-west for 52 miles, forming a loop which is the north and west boundary of the State. On the west border it is joined by the Chap and Anas.
4. All these rivers flow during the rainy season, and if the rain is abundant during the cold weather as well, but are dry during the rest of the year.
5. In the northern and eastern portions of the State the underlying rock is trap, capped at places with laterite and with sandstone below, while in the western and southern parts the underlying rock is sandstone, with veins of quartz cropping up at places. The soil, therefore, is very variable from black cotton soil to sand loam, and at places loamy sand is the result. The soil is fairly deep in valleys and along hill sides except where the slope is too steep, where sometimes bare rock is the result. At the top of the hills, sometimes, the soil is rocky and shallow; on the whole, the soil is sufficiently good for the production of tree growth. 3. Underlying rock and soil.
6. The climate is the usual one of the Rajputana hills. The lowest temperature is in February, 42 degrees, and the highest in May, 107 degrees. 4. Climate

The following is the maximum and minimum temperature during each month :—

Month.					Maximum.		Minimum.
January 1906	...	...	...	...	78	...	44
February 1905	...	...	...	...	79	...	42
March	"	...	...	...	89	...	62
April	"	...	...	...	98	...	59
May	"	...	...	...	107	...	82
June	"	...	...	...	98	...	81
July	"	...	...	...	90	...	75
August	"	...	...	...	87	...	78
September	"	...	...	...	90	...	74
October	"	...	...	...	89	...	66
November	"	...	...	...	87	...	60
December	"	...	...	...	85	...	48

7. The average rainfall is 35 inches. This year it is 45·59 inches, and in 1899, the famine year, was only 14 inches. The frost, not very common, is rare and far between.

b. Agricultural customs and wants of the population.

8. The agricultural customs are very primitive ones, except in Patel villages, and the wants of the population are almost entirely for small wood. Timber which is over 18" in girth is used in comparatively small quantities, and a length of over 20 feet is very rarely demanded, owing to the large supply which is yet available; more forest produce is at present consumed than is required for the well-being of the people, while large quantities are wasted for want of any check. In the absence of any data available, I take Colonel Doveton's estimates for a series of years with a similar population in the Central Provinces, though I think these are under the mark for Banswara as the people here have been under no sort of regulations from ages.

Minimum quantities required annually per head of population in the Central Provinces are—

							Maunds.
Fuel	...	...	...	...	...	...	5
Wood and Bamboos for building and for agricultural implements							4
Total	...						9

I do not take the figures for grass, as it is at present of very little value.

9. The following kinds of trees are in demand :—Teak (*Tectona grandis*) used as rafter wood, beams and uprights in houses; the leaves for thatching and for harvesting small grain such as kuri, etc.

Sadar, (*Terminlia tomentosa*) for rafters and beams. Tana (*Ongeini dalbergioides*) poles for carts, ploughs, and hoes, etc.

Temru (*Diospyros melanoxylon*) for beams, poles for carts and rafters, ploughs, etc.

Khairia (*Acacia catechu*) for house posts and agricultural implements; Haidu (*Adina cordifolia*); Bohin (*Soyimida Febrifuga*), Ghorar (*Albizia-prucera*) for beams for house building.

Dhaura (*Anogeissus latifolia*) for cart axles, ploughs, etc.

Mokha (*Schrebera swietonioides*) as beams; bark eaten during famine times.

Kakria (*Lagerstaemia parviflora*) for rafters.

Mohura (*Bussia latifolia*) for beams.

Shisham (*Dalbegia latifolia*) for furniture and bedsteads.

Dhaman (*Grewia vesitia*) for carrying poles, bed side, etc.

Bans (*Dendrocalanus strictus*) is used for roofing walls of Bhil huts, matting, baskets, etc.

10. In general terms it may be said that the demand on the forests for the requirements of the population is as follows :—

Wood and bamboos for building, agricultural implements, furniture, carts, mats, and baskets and for fuel.

Grass for thatching, ropes, fodder and grazing. Tanning, chiefly the leaves of dhaura bark of sadar khejra and babul.

Manufacture of spirits and article of food, the flowers of mahwa.

Manufacture of oil, the seeds of mahwa.

Besides the above, fibres are prepared, leaves used for thatching and other purposes, gums as medicines, etc., roots are eaten and exported.

II.—THE COMPOSITION AND CONDITION OF THE FORESTS.

1. Distribu-
tion and Area.

11. The Forest area is mainly on the north-east and south of the State, the central and most of the western portions being devoid of forests of any size. The area of the nine forests proposed to be reserved is estimated at 650 square miles, which includes about less than one-fourth of cultivation, or areas occupied by villages situated inside the proposed reserves, therefore, the net area of the proposed reserve is about 500 square miles, or say about one-third of the entire area of the State, which is 1,606 square miles, out of which only 400 square miles is under cultivation. Taking the above into consideration and the fact that agriculture mainly depends on rainfall, and hence no large extensions can at any time be possible, the areas proposed to be reserved are not excessive; chiefly as the Bhil community which, by far, is the largest community in the State, lives for the greater part of the year on the sale of forest produce of one kind or another.

12. The forests have not as yet been demarcated.

2. State of
Boundaries.

13. The State is the owner of all land not occupied by the cultivators, and hence it is the sole master of the forests.

3. Legal
Position.

14. Hitherto there has been no check whatever on the forests or forest produce of any kind; anybody may go without let or hindrance and cut what he pleases: (a) for his own use; (b) for sale or barter.

4. Rights.

But of late years the Customs Department of the State has fixed a certain amount of royalty on all timber, bamboos, and fire-wood, as well as gums, etc., taken for sale, which has not been contested; therefore, not to be hard on the people who have been using the forests from time immemorial, it may be said that the Zemindars of villages situated inside the reserves, or those adjoining them, have rights to cut—

(a) Timber and bamboos for house building and agricultural implements.

(b) Fire-wood.

(c) Grass and grazing and other minor produce for their *bond fide* personal use, and not for sale or barter.

5. Composition and Condition of the Crop.

15. The crop is an ordinary mixed one of the two-hill type. Broadly speaking, there are four types which are more or less represented in each of the forests proposed to be reserved :—

i. Plains portion at foot of the hills is either—

(a) Pure Khankra (*Butia frondosa*) where the soil is given to water-logging, but as soon as the sub-soil is sufficiently well drained, Teak and other species are mixed with Khankra.

(b) In places where the soil is light, Khairia Khejra and Zyzypus are the prevailing species.

ii. On old cultivation and abandoned village lands Zyzypus and Khejra, and on black soil Zyzypus and Babul are met with.

iii. The usual mixed forest of Teak and its companions such as Temru, Dhaura Sadar, Rohin, Dhudhi, Kharpatia, Tanaj, Shisham, Kakria, Khankra, Dhaura, Khankra, Bamboo, etc., Jaman, Ghorar, and Arjun being only found along the banks of the streams.

iv. On rocky soil where nothing else would grow, Salar and Karaili are the only species to be met with, not that these species are not found in the preceding types of the forests, but these are more common on rocky soil on which their possession is not contested by other species. These four types are sometimes separated by large grassy blanks.

The leaf canopy is very variable, from almost complete in sheltered places, where the soil and other conditions are also favourable, to open and interrupted.

16. The forests not having been under any sort of conservancy, the growing stock—except of these species which are considered of no value, such as Salar, Karaili, Bahera, Kharpatia, etc., or of those that are preserved for the sake of their flowers or fruits such as Mohura, and in some places Temru—is badly mutilated and deformed. No trees of any size of any of the valuable species such as Teak, Shisham, Sadar, etc.,

17. The trees are cut down in such a manner that no stumps were fit for counting the annual rings, and thereby judging the rate of growth. But Teak, the most valuable tree of the lot, is in this State at its northern limit and cannot be grown into a large-sized tree. No trees of this species, even near temples, where the people do not cut any trees, were found of any size.

18. No data are available as to production per acre of the produce of various descriptions. Only a part of the produce, that is timber of certain species, is at present saleable, owing to distance from centres of consumption and absence of good roads. These trees do not grow over the whole area of the forest in appreciable proportions, though scattered trees are found all over the forests. At present owing to the mutilated nature of the growing stock, and small size of the trees composing that stock, it cannot be expected that the yield will be more than a ton of timber of the small size per acre at present, but with protection it will increase to three or four tons per acre.

19. The rate of growth of Teak and other species in these forests is not known. I was only able to count rings on some four Teak poles of 36 inches in girth cut for the Dhambola Police Station, in Dungarpur State, and the average of these was nine rings per inch of radius, or say about 54 years for a girth of 36 inches.

20. Annual fires are the first and the foremost injury to which the crop is liable, which not only cut back, or kill the young trees, but by injuring the older ones render them more liable to the attacks of fungus and insects.

6. Injuries to which the crop is liable.

21. In exceptionally dry years the crop is liable to suffer from drought, as in the famine year of 1899 a large number of Teak trees died outright, as is apparent from many dead trees in the forests, after a lapse of seven years.

III.—SYSTEM OF MANAGEMENT.

22. There was no system of management in the past, but for the last two or three years a royalty is charged on all timber, fire-wood, and bamboos, etc., exported from the State on passing the Customs Nakas.

1. Past and present System of Management.

23. No works of any kind have been carried out.

2. Special Works of Improvement undertaken.

24. From 1st October 1905 to 30th September 1906, all revenue realized from timber and other forest produce by the State Customs Department, was Rs. 1,227-14-0. The expenditure cannot be given as the Customs Nakadars had their other work also.

3. Past Revenue and Expenditure.

IV.—UTILIZATION OF THE PRODUCE.

25. Marketable products are :—

(a) Timber of various species, for instance : Teak, Terminalias, "Temru, Tanaj, Albezias, Lebbeck, and Procera, Haldu

1. Marketable Products and Quantities consumed in past years.

(*Adina cordifolia*), *Dalbergia latifolia*, *Bassia latifolia*, etc., etc., are available, though at present only of small sizes.

(b) Fire-wood in large quantities is waiting for export.

(c) Bamboos.

(d) Minor produce, such as gums of sorts, roots, fruits, and flowers, etc.

26. There is no data as to quantities consumed during the past years.

2 Lines of
Exports.

27. Up to this the produce has only been taken to Salimgarh and Arnodh markets by the Bhils on heads or jusars dragged by bullocks and on carts to Rutlam and other places in Central India, and to some extent to Panchmahals in the Bombay Presidency. The cart roads to these places are only fair-weather roads and no carts can go along during the rains; this is no disadvantage in a country which is pre-eminently an agricultural one depending mainly on rains. As even if the roads were passable, no carts could be induced to go, all the available bullocks being used in ploughing.

28. The forest area in the State is intersected by many streams, and the chief river, the Mahi, is not very far from the majority of the forests. These streams can, in ordinary years, be utilized for floating timber. The timber may be cut and collected along the banks of the streams, and as soon as they begin to flow, it may be launched and taken down to the place where the river crosses the Railway line. It will certainly pay to take down timber in the Mahi rather than by the carts to Rutlam and other places. As for fire-wood the experiment may be tried and if it pays, the question of improving the forests will be rendered easier.

3. Markets.

29. Central India and the Panchmahals are the only markets open at present, but if the floating of timber in the Mahi be adopted, the chief markets will be Ahmedabad and other towns in Guzerat as well.

4. Mode of
Extraction
and its Cost.

30. As the extraction has solely been by private individuals at their own sweet will, and the royalty charged has also been only recently started, there has been no charge on extraction.

5 Net Value
of each class
of Produce.

31. As no departmental operations have ever been taken in hand, this cannot be ascertained, but the following are the rates of royalty charged on different products:—

				Rs.	As.	P.	
Timber	2	0	0 per cart load.
Fire-wood	0	8	0 " "
Bamboos	1	0	0 " "
Do.	0	1	0 head load.
Timber	0	2	0 " "
Gums	0	8	0 per maund.
Lac	0	8	0 "
Wax and Honey	0	8	0 "

V.—MISCELLANEOUS FACTS.

32. No forest staff has been maintained.

1. Forest
Staff.

33. As no works have ever been undertaken it cannot be said definitely whether the supply of labour for forest works will be sufficient, or otherwise. Bhils have from time immemorial been living on the forest products, and are the only labourers. They do not seem to like the idea of felling and converting large trees as it involves labour. Large trees of valuable species that have died down have been noticed standing near the villages unutilized, and sometimes set on fire to clear the ground, but not felled and utilized. The Bhils should be trained to use the saw, and as far as possible trees as large as can be found be given to right and privilege holders for their personal use to encourage this habit.

2. Labour
Supply.

PART II.

FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED.

1. Basis of
Proposals.

34. The proposals are based on the assumption that the forests require improvement and protection in the first place; and not more than a ton of small timber per acre absolutely from dead, dying, mal-formed and stunted trees be obtained. That firewood-yielding trees should not at present be exploited, except so far as they be interfering with the growth of the more valuable trees. See para. 54 to 59.

35. That leaving the reproduction in areas covered by trees to nature, grassy blanks to the extent of 300 acres per annum be planted, or sown with Teak, and nurseries be established to fill up the blanks in these sowings. See paras. 77 to 78.

36. That fire conservancy, if attempted in the whole area, will be too costly and hence be undertaken in a few selected areas.

37. That lac culture may be taken in hand owing to large areas being covered with species suited for that product. See para. 80.

2. Working
circles how
composed,
reasons for
their forma-
tion.

38. It is proposed to divide the proposed nine demarcated forests into nine working circles, and the whole of the undemarcated area into one separate working circle as under.

39. Reserve No. 1 Pipal Khunt, Pipalda forest, into two working circles :—

- (a) Pipal Khunt working circle.
- (b) Pipalda working circle.

The division between these two may fix the road from Bhungra to Pipalda.

40. Nos. 2 and 3 into two working circles :—

- (a) Bhungra working circles.
- (b) Jagpura and Bassi Badana working circle.

The former, comprising that portion of the reserve which is used by the Bhungra, etc., villagers, and from which they export timber to Rutlam and other places; and the latter, the other portion of the forest and the Bassi-Badana forest. This working circle will have to be worked by Departmental agency.

41. No 4 will be constituted into a separate working circle as, it being comparatively closer to the centre of consumption, even fire-wood may to a certain extent be saleable.

42. Nos. 5 and 6 will be constituted into one working circle, viz., the Khandu working circle.

43. No. 7 will be formed into two working circles :—

- (a) Banswara working circle.
- (b) Kalinjra working circle.

The produce of the former will, for the present, be utilized for the requirements of the Banswara town ; only surplus, if any, shall be exported, and that of the latter, after meeting the requirements of the right holders, exported to the Panchmahals.

44. No. 8 Chandarwara and No. 9 Shergarh forests will be formed into two separate working circles.

45. The whole of the undemarcated area may be formed into a separate working circle. This comprises all waste land not assessed to land revenue.

46. The whole forest area of the State wants at present one treatment, i.e., improvement, but the local requirements of the population demand that the area be divided into a number of working circles.

47. For the interests of the forests and the State, the number of working circles should be as few as possible, as then supervision is easier on account of the work being concentrated ; and for the interest of the people themselves, working circles should be as numerous as the number of villages ; as then they will not have to go far for their requirements,—but in the latter case the supervision is next to impossibility ; therefore, with due regard to both, I propose that nine working circles may be formed for the following reasons.—

48. The Bhils living in No. 1 take the produce to Arnodh and Salimgarh, in Pertabgarh territory, and it is necessary for them to have the working circles so formed, that they may take without much inconvenience.

49. Again, Bhungra putta villagers take timber to Malwa through Danipipalia and, if their wants were not consulted, they would be put to inconvenience. Similarly, Khandu villagers take their produce to Malwa and their wants have also to be met with ; wants of the Banswara town should also have due consideration.

50. Besides this, if the number of working circles were reduced the people will be required to go at a distance for work, which they do not like to do.

51. Each working circle is proposed to be divided into 15, more or less, equal parts. The boundaries of these should either be ravines, ridges or paths existing, or newly made. No attempt is at present made to divide the compartments according to the growth, but simply to conform with the coupes of each year. As it is proposed to work out the present mutilated stock in 30 years, each coupe to be gone over twice in this period after an interval of 15 years.

2. Compartments—justification of the subdivision adopted.

52. The crop consists of much mutilated growing stock with inferior species useless, and at present owing to remoteness of the centres of consumption, it is simply proposed to improve the growing stock ; and the area checked, with the removal of only those trees that can, with due

3. Analysis of Crop ; Method of Valuation employed.

regard to sylvicultural conditions strictly, be removed, is considered sufficient. Detailed valuation under this simple treatment is not considered necessary.

METHOD OF TREATMENT.

1. Object sought to be attained.

53. The object sought to be attained is to maintain these lands to act with beneficial influence in attracting rains, and to maintain the water supply, which in a locality depending mainly on rains for its water supply is a no small factor; and to yield as much revenue to their owner as may consistently, with due regard to the above and the wants of the local people, can be obtained; provided their existence as forests is not only maintained but improved as well.

54. The object sought to be attained is the same in all the working circles, the only difference being, that in the working circles Nos. 1, 2, 3, 5 and 6 the villagers living inside, or along the forests are accustomed to cut and export timber and bamboos, while in the others no such customs exist. In these five working circles trees to be felled may, in the first place, be marked by the Forest Officer or Range Officer under his direction, and the people may then be allowed to fell and export them, while in the others, the tree will be marked and then felled and exported departmentally, or tenders may be invited after marking the trees; but these are mere matters of detail and the object sought for is the same.

2. Method of Treatment adopted.

55. If the whole produce were saleable, the simplest method to adopt would be coppice with standards, but as only a fraction of the produce is really saleable under present circumstances, it is best to adopt improvement-felling method, which differs only in the intensity of working. Instead of leaving 20 or 25 standards per acre in the former method, and felling the whole of the remaining stock only, those trees which are unsound, dying, or malformed will be removed under the latter method.

3. Exploitable age.

56. No data are available to fix the exploitable age of the crop. There are next to no mature trees of the species that are at present saleable. The forests having been open to every man who has the inclination to go and cut any produce, the trees have been treated in a most barbarous manner. If a man wanted a two-foot piece of certain dimensions, instead of felling a tree, he would climb the tree, cut the required portion and thus destroy the whole tree. As the local requirements are chiefly for small poles and saplings, the valuable trees such as Teak, Sadar, Dhaura, Temru, etc., are not allowed to grow beyond those dimensions.

57. It is not necessary for the present proposals to fix the exploitable age, as the main object for the present is, to put the forests in the way to improvement. Only those trees will be removed which are unsound or mutilated, dying or dead, or the trees of inferior species interfering with the growth of promising individuals of more valuable species. After 15 years, for which these proposals are framed, the condition of the forests will have considerably been improved, and data about the rate of growth collected by the Forest Staff available; then it will be time to decide about the exploitable age of the crop.

THE FELLINGS.

58. The working scheme will be similar in all the working circles of the 500 square miles = 3,20,000 acres proposed to be reserved; about one-fifth is grassy blank and about one-fourth of the remainder is stocked with Khankra, Zyzyphus and other species, which at present are not saleable, the remaining 1,92,000 acres is stocked by such species as are saleable. In the present state of the forests not more than a ton of small timber per acre can, with due regard to sylvicultural conditions, be extracted. Although with protection the stock will improve, and in the latter years of the period it will be possible to take out about double the amount, I base my calculations on one ton per acre to be on the safe side, and thus the total yield in timber during the period of 15 years = 1,92,000 tons, and out of this the department has to meet demands of right-holders, living in or along the reserved forests. Assuming that one-third of the population of the State, or say in round numbers 50,000 people have to be provided for (though in reality these will be less than that), and taking the average yearly consumption of four maunds of timber per head of population, the total during the period will be $\frac{50,000 \times 4 \times 15}{27} = 1,11,111$ tons, or in round numbers say 1,12,000 tons, leaving a surplus of $(1,92,000 - 1,12,000) = 80,000$ tons for export or sale. The wants of the remaining population will be met with from the undemarcated forests, and if any one of them wants from these forests, he will have to pay for it.

1. The general working scheme and calculation of the possibility.

59. Besides the above there will be a large quantity of fire-wood available for sale, but as the demand is very much below the supply available, there is no necessity for the present to calculate the possibility of this produce. Trees or portions of trees cut in the ordinary course and not fit for timber, and dead and fallen trees of the species not suited for timber, may be sold as fire-wood. Efforts may also be made to turn such stuff into charcoal where there is no demand for fire-wood owing to their being in the out-of-the-way localities.

60. Bamboos may also be worked in a systematic manner; one-fifth of each working circle may be opened each year for the extraction and then closed for four years. In this way at least about two lakhs of bamboos may be available for sale and for use by the right-holders: of this only one-fourth or 50,000 may be taken as available for sale; for the present 7,50,000 in the whole period.

61. The fellings are prescribed for a period of 15 years, at the close of which the scheme may be revised in the light of experience gained and data collected during the first period.

2. Period for which fellings are prescribed.

62. The area to be felled annually is about one-fifteenth of the area of each working circle. As the forests have not yet been demarcated, the order of their allotment is not fixed, but it is immaterial in which order the fellings take place. The felling should be started at one end of the working circle and continued towards the other in consecutive order of

3. Areas to be felled annually; or periodically order of their allotment.

the compartments. As it is proposed to divide each working circle into 15 compartments, corresponding with the coupes of the first period, the compartments should be numbered from the side the fellings are started.

4. Nature
and mode of
executing the
fellings.

63. It is proposed to work the forests on the improvement-felling system. The trees to be felled will be marked by the Forest Officer who, while marking the trees for fellings will observe the following rules :—

- (i) No sound growing tree of any of the timber-yielding species will be marked for fellings on any account.
- (ii) All dying, malformed, unsound trees of timber-yielding species should be marked for felling, provided :—
 - (a) No isolated tree, however deformed or unsound, be marked.
 - (b) No tree standing on a precipice, or very steep ground, be marked.
 - (c) No tree standing along the border of a large blank be marked.
- (iii) The trees of species not yielding timber be only marked for felling or girdling, whichever be cheaper, when they are interfering with the promising individuals of valuable species, or are likely to interfere within a short time.

The trees felled should all be cut flush with the ground and the stools properly dressed, except in the case of trees over 6 feet in girth which are not likely to produce coppice shoots. Such trees may be felled 6 inches to 1 foot above the ground.

64. In working circles 1, 2, 3, 4, 5 and 6 the Bhils may be allowed to cut the trees marked and export to markets on payment of fixed royalty fees, but some of the trees marked will not be cut by the Bhils, as they will not yield any timber. These may be cut departmentally and the produce, if any saleable, disposed of.

65. In the other circles cutting and export will have to be done by departmental agency, till private persons agree to take up the standing trees. Whatever agency be employed the department should see that the stools are properly dressed.

66. In the undemarcated working circle the only restrictions to be imposed are :—

The following kinds of trees may not be cut without permission in writing of the village headman, or such other man whom the Kamdar may appoint if the headman be not competent or has abused his authority :—

- | | |
|------------|-------------------|
| 1. Teak. | 7. Sarin. |
| 2. Sadar. | 8. Kikar (Babul.) |
| 3. Mohura. | 9. Khejra. |
| 4. Temru. | 10. Haldu. |
| 5. Tanaj. | 11. Robin. |
| 6. Ghorar. | 12. Khairia. |

All other trees may be cut or lopped for fodder without permission for their *bonâ fide* personal wants, or for sale of dry fire-wood in head loads only by the Bhils, provided no tree less than hath in girth be cut or lopped for fodder. Cutting down of young trees for feeding browsers should be stopped.

67. Trees of the twelve kinds noted above may be permitted by the headman of the village for the *bonâ fide* personal wants of the Zamindars, but no tree less than hath in girth be allowed to be cut unless there are no trees of that girth available in the forest.

68. No trees be cut for sale or for barter in the circle except with the permission in writing of the State Kamdar.

69. After the conclusion of the first period of felling, there will be *an improved stock of more valuable species—(a) of coppice shoots from one to 15 years of age ; (b) as well as many self-sown seedlings of different ages ; (c) the sound growing trees reserved in the 15 years to come will have put up additional growth, and with better protection will be at least twice their present value. The production per acre would have increased at least from one ton, the present estimate, to three or four tons, and hence at the conclusion of the present period of 15 years the stock will have increased to three times its present value.*

5. Forecast of condition of crop at their conclusion.

SUPPLEMENTARY REGULATIONS.

70. The result of fire protection is that along with valuable species, undesirable kinds of vegetation, such as climbers, have also better chance of reproduction. Sometimes less valuable species get an upper-hand of the more valuable, and thus it is necessary that the Forester should interfere. The creepers, specially of larger kinds, render their victims of little value as timber trees ; these should be cut down ; and once in five years will be enough for this purpose, as well as helping the more valuable species against its less valuable assailants. Sometimes bamboos will interfere with the growth of teak, and this should be helped by cutting down a few bamboos. Sometimes individuals of the same species may be growing too close together, so as to be unable to grow healthily, and then they should be thinned out ; but I am afraid this will not be necessary during the first period.

1. Cleanings, thinnings, or other improvement fellings.

71. The grass in the forests and in waste, or in even cultivated lands is so plentiful, and the cattle in the majority of cases are not numerous enough to cause any apprehension on this account ; but there is no forest in which the cattle may not be grazing.

2. Grazing and other rights.

The grazing right may safely be admitted, but the number of cattle belonging to each village, recorded. They may, at the same time, be allowed an increase of 50 per cent. over the number thus recorded. Any excess over that should be paid for if admitted into forests, but certainly there should be no right to graze any cattle above the prescribed number.

This is necessary because the grass and grazing may become more valuable in the future by opening up of the country by roads, and probably by railway in the remote future.

72. The other rights are timber, usually small poles and saplings, and bamboos for house-building and agricultural implements, and fire-wood for burning and for sale in head-loads by Bhils. Minor produce such as gum, lac, honey, flowers, and fruits, etc., are also at present collected by the Bhils subjected to paying of Customs duty at the time of export. This provision is, I think, defective, as the customs can and are only collected at certain routes; men having carts or transporting pack animals follow those routes, but the Bhils are not bound to go by any particular path and, therefore, most of these articles pass out of the State border without paying any duty; by this the Partabgarh State, and not the Bhils, enjoy any benefit.

73. To avoid this hâts may be opened out at Semlia and Pipalda, and cart roads to Salimgarh and Arnodh constructed.

After writing the above, I was told by the Kamdar that he had proposed these cart roads to Arnodh and Salimgarh, but the Partabgarh Durbar had protested against it, and so the project fell through.

If the Partabgarh Durbar be against construction of cart roads in his territory, from Semlia to Arnodh and from Pipalda to Salimgarh even at the expense of the Banswara State, even then a hât at Semlia could be started and the traders can take the produce they buy at Semlia *via* Partabgarh to Mandsaur.

74. In the beginning the rates at which different kinds of produce are sold by the Bhils generally to the traders, may be fixed lower than those at Salimgarh or Arnodh, to make it worth while for the traders to go there.

75. As for Pipalda, a road may be constructed to Danipiplia—for the greater portion of it is already passable for carts—and it will be worth while to render the remaining portion fit for the passage of carts.

76. As far as the funds allow, all the forest should be opened out by the paths that can be got at by carts, this will enhance the value of the forests.

3. Sowing,
planting or
other works
special to
each circle.

77. The areas that are at present under tree growth may, for the present, be left to nature to improve the growing stock. With protection from fire the self-sown seedlings will cover the small gaps, but there are large grassy blanks in all the working circles that may, with advantage, be planted up.

In the beginning only those areas which have fairly deep soil may be taken up in compact block, and before one taken up is not finished others may not be taken in hand. There are three large grassy blanks in Pipal Kunt, Pipalda, as proposed reserve. The one on the Pipal Kunt to Pipalda road may first be taken up, after this is completely stocked, others may be taken gradually. Similarly there is a large grassy blank in

Khandu north-west proposed reserve near Mota Khera. This has fairly deep soil, and at 100 acres a year will take about 15 years to completely stock it.

Similarly there is a large blank along Shergarh with path in the Shergarh proposed reserve which may also be taken up. Thus three may be taken in hand simultaneously : say 100 acres per annum in each of these forests, or 300 acres per annum in all. The lines should be 20 to 30 feet apart and sown with teak seed. On operations of this kind in the Central Provinces the cost is Rs. 2-8 to Rs. 3 per acre, or say Rs. 900 per annum.

78. The proportion of valuable species in the forests will, as far as possible, be encouraged by wounding the soil round seed bearers, or by planting cuttings of species like Ghorar along the nullahs. Nurseries may also be made to fill up the failures in the sowings proposed.

79. The first and foremost improvement required is the opening out of the forests by roads; with protection, the growing stock will improve, and in time even timber of large dimensions will be available, and unless the forests are opened out by roads, the produce could not be extracted economically. Moreover, it will be found cheaper to lay out the roads now than when the forests, with protection, have grown up thickly, it will not be possible to make the roads at once owing to the question of cost, but it would be better if the lines were laid out and kept clear till funds were available for turning them into cart roads. The lines should, as far as possible, be made to conform with the boundary lines of compartments, as these will then serve the double purpose of boundary lines and export lines, and also serve as fire lines.

4. Improvements common to whole area.

Forest guard's huts and range quarters may also be constructed at suitable places.

MISCELLANEOUS.

80. There is a large and growing demand for lac. Three kinds of trees given below in the descending order of their prevalence in the forests of the State, are suited for lac culture:—

Miscellaneous Prescription.

(1) Khankra (*Butia frondosa*).

(2) Bor and Katbor ... { *Zyzyphus Jajuba*.
" " *Nummularia*.
" " *Zylapara*.

(3) Pipal.

The insects growing on these different species are different; seed of each kind may be obtained and propagated. This measure is sure to enhance the value of these species very much. None of these species is used at present in the Banswara State.

81. The following Forest Staff is proposed to be entertained : —

A Superintendent of Forests on Rs. 200 rising to Rs. 300 per mensem, for the three States of Banswara, Partabgarh, and Dungarpur.

2 Changes proposed in the Forest Staff.

His office staff to consist of :—

	Per annum.
	Rs.
1 Clerk on Rs. 30 per mensem	360
1 Munshi " 10 "	120
4 Peons on " 5 each "	240
Total ...	<u>2,400</u>

Total Rs. 3,120 per annum, or with periodical increments of the Superintendent's pay, say Rs. 3,600 per annum for the whole period ; therefore, the cost of establishment proposed is :—

	Per annum.
	Rs.
Share of Superintendent's and Establishment pay	1,200
Forest Officer on Rs. 80 to Rs. 150, or say Rs. 100 per mensem	1,200
3 Foresters on Rs. 15 to Rs. 40 per mensem each on Rs. 25 per mensem for the whole period	900
5 Forest Guards on Rs. 10 per mensem each	600
5 " " " 8 " " "	480
10 " " " 7 " " "	840
15 " " " 6 " " "	1,080
1 Clerk on Rs. 25 per mensem	300
2 Muharrirs on Rs. 10 per mensem each	240
4 Peons on Rs. 5 per mensem each.	240
Total ...	<u>7,080</u>

per annum, or for the whole period of 15 years = Rs. 1,06,200.

3. Financial results of proposed working.

82. The following are the financial results of the proposed working during the first period :—

I. RECEIPTS.	Rs.
80,000 tons of timber @ Rs. 3 per ton	2,40,000
There is a large quantity of fire-wood, but taking that nearer the centres of consumption and resuming the present rate of As. 8 per cart, 80,000 cart loads of fire-wood @ As. 8 each ...	40,000
7,50,000 bamboos @ As. 5 per 100	2,344
Grass, Grazing and other minor Produce	11,560
Total Receipts ...	<u>2,93,904</u>
II. CHARGES.	Rs.
Demarcation	15,000
Sowing, Planting, Nurseries and Lac Culture	18,000
Roads	15,000
Buildings	5,000
Cleanings, Thinnings and Creeper Cuttings	15,000
Fire Conservancy	30,000
Purchase of Tools and Plant	2,000
Pay of Establishment	1,06,200
Travelling Allowance of Establishment	20,000
Contingencies	8,000
Total Charges ...	<u>2,31,200</u>
Net Surplus ...	<u>59,704</u>

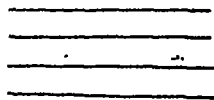
It may be noted that the net receipts on timber and fire-wood at the current rates have been quoted. In forests where the produce will have to be extracted departmentally, the cost of cutting and transport will be more than covered by the higher rates realized.

83. (1) *General Scheme*.—As the preparation of working plans depend on the amount of data available for their formation, it is proposed that records should be kept up in the Forms prescribed by the Forest Department Code as far as possible.

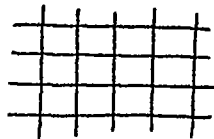
4. Collection of data and upkeep of control forms.

- (2) *Periodical Measurements of sample Plots or Areas*.—To obtain information regarding the rate of growth of different species, it is proposed that two sample plots of half an acre each should be marked out in each of the nine working circles, and measurements of girth at $4\frac{1}{2}$ ft. from the ground be taken and recorded in a book every year. To ensure the measurements being taken at the same place, a band of white paint should be painted round each tree. The tree should be numbered consecutively and the numbers allotted in the book should be painted on tin plates and nailed on to the trees.

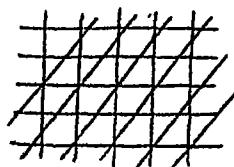
- (3) *Fire Conservancy Registers and Maps*.—The area burnt in each forest should be noted in the Fire Conservancy Register, and tracings of each reserved forest showing the compartments kept up for fire conservancy record. Each map should suffice for five years' record. The area burnt for the first time should be shown by parallel lines thus :—



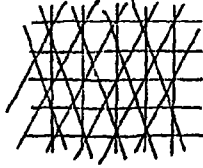
Those burnt twice by vertical lines thus :—



Those burnt three times, by diagonal lines thus :—



Those burnt four times by
diagonal lines in the op-
posite direction thus :—



Those burnt five times by
adding dots to above.

These maps will show at a glance what areas have escaped fire, which have burnt once, twice, three times, etc., during the period.

- (4) Forest Journal showing work done during each year, in each of the working circles, with their results, cost of operations, and the revenue—if any realized—should be kept up to enable the revision of the plan being made easy ; giving detail as to the number of compartments in which operations of each sort were carried out. All special features of the year should also be noted.

84. It is also proposed that Control Forms, as far as possible, according to Form Nos. 2 and 4 prescribed in the Forest Department Code, be kept up.

APPENDICES.

APPENDIX No. I.

Description of Forests in the Banswara State.

No.	Name of Forest.	Boundaries.	Soil, Elevation, Aspect, etc.	Description.	Proposals and Remarks.
1	Pipal Khunt, Pipalda Forest.	North—State boundary. East—Katarla Khora, Limbadabra and Kalin Khora forests and State boundary. South—Banswara-Rutlam road from State boundary to the Mahi. West—the Mahi river.	Elevation 680 to 1,405 feet above sea level. Slope—level to very steep. Aspect—all aspects. Soil is very variable from good deep one to shallow and bare rock at places. There is no leaf mould even in places where the canopy is fairly dense on annual fires.	The forest is a mixed one of Teak, Sadar Arjan, Bahera, Dhaura, Salar, Karuli, Dudhi, Khanakra, Bor, etc., with bamboos. There is almost pure Khanakra along the Mahi and other low grounds at places. Bor is the only species in the deserted villages with large blanks intervening. A ridge beyond Pipalda is covered with almost pure <i>ongenia dalbergioides</i> . The composition and density is very variable. At places Teak forms one-twentieth of the crop only, while at others it represents almost half of the stock on the ground. The stock is, however, much mutilated and with the exception of Salar, Karuli, Bahera, and a few other species such as Kharpatia, etc., are of no great size. The species that can be sold or are used in the construction of huts by the Bhils are not allowed to grow beyond the low pole stage. The bamboos are cut too high as well as all the other trees.	It is necessary that the deforested, mutilated stock of the valuable species is cut back to ensure healthy shoots from the stools. The large blanks require also to be planted with Teak. The proportion of other valuable species may also be increased, by helping natural regeneration and planting and sowing. The cutting of bamboo should also be done close to the ground.

2 Bhungra Jagpura Forest.	North—Jagpura, Charna, Narwali and the Mahi. East—Dungria, Jaitpura, the Mahi Dunga, Mundamatia, Gadra, the Mahi, Bargun, Bhungra, Girnawat and the Mahi again to Banswara road. South—Road to Baifalab. West—Banswara, Katlas, Ghara, Kabanin, Kardiancheri, Ghatal, Khamera. Kanthao, Jhuyar, Pathar, Dilawia, Walpura, Kunwari and Kandlao and back to Jagpura.	Elevation 600 to 1,200 feet. Slope—level to very steep and at places precipitous. Aspect—every aspect is represented. Soil—very variable, deep to shallow and bare rock in several localities; no leaf mould.	A mixed forest of Teak and its usual companions, and the bamboos <i>Dandro calamus</i> , <i>strictus</i> ; leaf canopy very variable from almost complete to very open and even interrupted; large grassy blanks are seen on the top of hills probably the result of old shifting cultivation. The trees are all mutilated, and on bad bases generally, and cut too high.	Same treatment as for No. 1.
3 Bussi Badana Forest.	North—Ganora, Lambapara and Dudka village lands. East—Konari Jerna, Aipara and Baroli villages. South—Sandani village. West—Sewa Kapara, Haro and Ganora villages.	Elevation about 600 to 800 feet. Slope—level to very steep. Aspect—all aspects. Soil—generally good deep one except towards top of the ridges where it is more or less; no leaf mould.	A mixed forest of Teak and its usual companions; the proportion of Teak near and between Bussi and Badana villages is fairly large. This has been heavily cut over. No trees of large size are met with. The bamboo has been almost exterminated by over-cutting. Large number of Teak trees were cut in the famine year by the State from this forest and some of these are still lying near Badana village, but these are of little use.	Same treatment as for the above, with the exception that no bamboo should be cut for at least five years.
4 Sarwan Nadia Forest.	North—Banswara road to Sarwan. South and East—State boundary and the Mahi. West—Sarwan Arigath, Deri and Nadia villages.	Elevation about 700 to 1,000 feet. Slope—level to steep. Aspect—all aspects. Soil—deep to shallow. No leaf mould.	A mixed forest of the usual type; Salar on poor shallow soils with a very open leaf canopy. In other places where the soil is better, leaf canopy is fairly dense. As usual all the species represented are on bad basis and malformed. The stock is rather poor on account of the comparative easy access to the markets.	Improvement fellings required.

APPENDIX No. I.—(contd.)

Description of Forests in the Banswara State.

No.	Name of Forest.	Boundaries.	Soil, Elevation, Aspect, etc.	Description.	Proposals and Remarks.
5	Khandu, East ...	North—the Mahi river. East and South—State boundary. West—Kilsi, Khem, Khandu, Birpur, Mendia, and Khem.	Elevation 700 to 1,310 feet. Slope—level to very steep. Aspect—North-west generally. Soil—generally good, deep at places, rocky, no humus.	A mixed forest of Teak and its companions Khair, Dhaura, Sadar, Kakria, Khankra, etc. Bor in old village sites. If anything more severely cut up on account of its vicinity to centres of consumption, grassy blanks are of common occurrence. The trees composing the present stock are mostly deformed.	Protection with improvement fellings proposed.
6	Khandu, North-west ...	North and West—Boundary of Khandu Jagir. South-East—Loda, Kiba, Khem, Khandu, Bhutpara, and Chhota and Mota Khem villages.	Elevation 600 to 1,702 feet. Slope—level to very steep and at two places precipitous. Aspect—a general aspect of south-east and east. Soil—generally fairly deep and rich, rocky and poor on very steep ground. No leaf mould.	Same as above, except that the proportion of Teak at places is larger. A huge grassy blank is near Khem village.	Ditto ditto
7	Banswara-Kalinjra Forest.	North-East—Banswara and Konda village lands. South—Khandu-Jagir boundary and then Kushalgarh Chieftship boundary till it joins the Anas.	Elevation 740 to 1,249 feet. Slope—from level to steep and at places precipitous. Aspect—every aspect represented.	A mixed forest of Teak, Sadar Dhawra, Khankra, Dhaura, Khankra, Kalam, Khair Rohin Salar, Mouti, Angnera, Dhudhi, Khirni and other species, the composition and density varies considerably, is much mutilated and deformed. The bamboos are cut high above the ground, and hence there is no room left for development of the	Protection and improvement fellings required; cutting of bamboo in the forest beyond Nal should be prohibited to give the few clumps that do exist, a chance of spreading.

8	Chandarwara.	<p>North-West—Banswara, Singhpura, Tutuber, Nawagon, Nimitan, Salia, Pardia, Karji, Gopara, Kalinjra, Parb, Tanda, Bhupatpura and Bharwa villages and the Anas river.</p> <p>North—Chandarwara village and the Anas river. East—Anas river. West—Khuta, Tamatia and Nagaon villages. South—Jalampara, Salia and Wardipara villages.</p>	<p>Soil very variable from stiff clay to sandy loam of all shades is noticed, generally good and fertile, except in very steep ground where it is rocky at places and bare rock is at the surface. No leaf mould.</p> <p>Elevation—500 to 900 feet. Slope—level to gentle. Aspect—all aspect. Soil—generally good, deep one, but at places shallow and rocky. Humus absent.</p>	<p>clumps. Bamboo is found, but rarely beyond Nal, and this perhaps due to over-cutting by the Bhupatpura and other villages, who now have to go to Nal for it. In sheltered places the crop is fairly dense, but on exposed ground, it is generally poor owing to annual fires, as there is no chance of young trees escaping in such localities.</p> <p>A mixed forest of Teak and its usual companions, all more or less in a mutilated state. Large grassy blanks with Zyzphus, Jujiaba and Khejra in the old abandoned cultivation. The cutting of poles for feeding a few goats is seen very commonly. In one locality 35 young Billi trees were noticed cut down for 10 or 15 goats. No bamboos.</p>	<p>Improvement fellings and protection are suggested. Forest is an easy one along the bank of the river Anas, and hence the export of timber will comparatively be easy. Carts can go over larger portion of this forest.</p>
9	Shergarh.	<p>North and North-east—Piplai, Dokar, Dad Nawarpadar, Kalarwara Dhauka, Wardipara and Salia. East and South—Kesharpura, Tanda, Phalwa, Tejpur, Rain, Kurnia, Jhanjarwara and Khunta villages, and the Anas river. South and West—State boundary.</p>	<p>Elevation 700 to 1,268 feet. Slope—flat to gentle except in a few where it is very steep. Aspect—all aspects are represented. Soil fairly deep and fertile except at very steep localities. No leaf mould on account of annual fires.</p>	<p>A mixed forest of Teak and its companion, pure Khaukra being found as usual on the water lode. The forest is much mutilated and over-worked as the others, with the exception that timber is not cut but preserved for the sake of its fruits; therefore, fairly big trees of this species are met. The places where there was pure teak are now grassy blanks, as they were cut down by a lessee some years ago under a contract from the Garhi Raoji. Bamboo is also suffering from over-cutting and wants to be protected. There is a sprinkling of good sized Haldu and Mahura.</p>	<p>Protection with improvement fellings and stoppage of bamboo cuttings for a time is proposed.</p>

APPENDIX II.

List of Trees more commonly found in Banswara State Forests.

No.	NAME.	Local Name.	Uses to which may be put.
1	<i>Acacia arabica</i>	Babul Bawal	For carts, agricultural implements, and house-building.
2	" catechu	Khairia	House-posts
3	" leucophlea	Khejra	"
4	<i>Adina cordifolia</i>	Haidu	Agricultural implements.
5	<i>Aegle Marmelos</i>	Bill, Billi...	Beams and door leaves, and carving and turning.
6	<i>Ailanthus excelsa</i>	Arua	Beans and karis, leaves for fodder, fruit in native medicine.
7	<i>Albizzia lebbeck</i>	Sarin	For floats at ferries on the Mahi.
8	" procera	Ghorar	For beams, oil and sugarcane pressers, etc., and for bangles.
9	<i>Anogeisus latifolia</i>	Dhawra	"
10	" acuminata	Kaura	"
11	<i>Balanites Roxburghii</i>	Hingot	"
12	<i>Bassia latifolia</i>	Mahura	Fruit and wood ashes used in native medicine.
13	<i>Bauhinia purpurea</i>	Kral	Beams, etc. Flowers in manufacture of spirits and articles of food, seed for oil.
14	<i>Bombax Malabaricum</i>	Somal Hemala	Flowers eaten as vegetable, wood for agricultural implements.
15	<i>Boswellia thurifera</i>	Salar, Halar	Scabbards for swords, pack boxes. As help to float heavy wood.
16	<i>Briedelia retusa</i>	Angnera	Charcoal for smelting iron.
17	<i>Butea frondosa</i>	Khankra	House-building, turning and carving.
18	<i>Carissa Carandas</i>	Kamunda	Fire-wood, rough cordage from the root, bark, lace. Insect may be reared on it.
19	<i>Casearia tomentosa</i>	"	Fire-wood and hedges. Fruit eatable.
20	<i>Cassia fistula</i>	Amaltas	Agricultural implements and house-building.
21	<i>Dalbergia latifolia</i>	Shisham	Fruit used in native medicine.
22	<i>Diospyros melanoxylon</i>	Tomru	For house-building, furniture, etc.
23	" montana	Umbia	"
24	<i>Erythrina Suberosa</i>	Dhaura Khankra...	"
25	<i>Enginia Jambolana</i>	Jaman	Fire-wood.
			House-building and agricultural implements.

26	<i>Ficus Bengalensis</i>	...	...	...	...	Bar	...	For shade and fire-wood.
27	" <i>religiosa</i>	...	...	...	...	Pipla	...	" Lac insect may be reared on it.
28	<i>Garuga pinnata</i>	...	...	...	...	Kharpatia	...	For beams. Fruit is pickled.
29	<i>Gmelina arborea</i>	...	...	...	...	Sewan	...	Furniture and house-building.
30	<i>Gevia vestita</i>	...	...	...	...	Dhaman	...	Carrying poles and furniture.
31	<i>Holarrhena antidysenterica</i>	...	...	...	...	Dhudhi	...	Wood carving and furniture. Seed used in native medicine.
32	<i>Lagerstrœmia parviflora</i>	...	...	...	...	Kakria	...	Agricultural implements and house-building.
33	<i>Mangifera indica</i>	...	...	...	...	Anba	...	Door leaves, boxes, beams, etc. Fruit eaten.
34	<i>Melia</i>	...	...	...	...	Limbra	...	House-building and furniture.
35	<i>Mimusops</i>	...	...	...	...	Rain	...	Oil presses and turning.
36	<i>Odina wodier</i>	...	...	...	...	Godlio, Moin	...	Heart-wood only for beams and furniture.
37	<i>Ougeinia dalbergioides</i>	...	...	...	...	Tanaj	...	For cart poles, agricultural implements, etc.
38	<i>Phoenix sylvestris</i>	...	...	...	...	Khajur	...	For beams. Juice for making <i>gur</i> and spirits. Fruit eaten.
39	<i>Phyllanthus emblica</i>	...	...	...	...	Ambia	...	Agricultural implements and for well work. Fruit used in medicine and dyeing and also eaten. Bark in tanning.
40	<i>Procarpus marsupium</i>	...	...	...	...	Bia	...	House-building and agricultural implements.
41	<i>Schbichera trijuga</i>	...	...	...	...	Kacham	...	" "
42	<i>Schrebera Swistenoides</i>	...	...	...	...	Mokha	...	" "
43	<i>Soyimida febrifuga</i>	...	...	...	...	Rohin	...	" and railway sleepers.
44	<i>Stephegyne parvifolia</i>	...	...	...	...	Kalam	...	" agricultural implements.
45	<i>Sterculia urens</i>	...	...	...	...	Karaili	...	Fire-wood and to help floating heavy woods.
46	<i>Tamarindus indica</i>	...	...	...	...	Imbli	...	Furniture, cart wheels, oil presses, etc.
47	<i>Tectona grandis</i>	...	...	...	...	Sag	...	House-building, furniture, railway sleepers, etc.
48	<i>Terminalia arjuna</i>	...	...	...	...	Arjan	...	Beams, Karis, etc.
49	" <i>bellerica</i>	...	...	...	...	Bahera	...	Well work. Fruit used in medicine and for dyeing.
50	" <i>tomentosa</i>	...	...	...	...	Sador	...	House-building, Railway sleepers, etc.
51	<i>Vitex negundo</i>	...	...	...	...	Vana	...	Live hedges.
52	<i>Woodfordia floribunda</i>	...	...	...	...	"	...	Agricultural implements.
53	<i>Wrightia tinctoria</i>	...	...	...	...	Khirmi	...	Turning, bangles, etc.
54	<i>Zyzyphus jayuba</i>	...	...	...	...	Bor	...	Agricultural implements and house-building
55	" <i>nummularia</i>	...	...	...	...	"	...	Bed posts and walking sticks ...
56	" <i>zylopara</i>	...	...	...	...	Kat bor	...	Fire-wood ...

Lac insect may be reared on these species.

(Sd.) MULRAJ,

EXTRA ASST. CONSERVATOR OF FORESTS,

Punjab.